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We should like to call attention to the fact that the book does not present a monotonous typography as stated. The reason for this criticism rests, not on the type, which presents plenty of variety, but on the fact that the book is not stuffed full of pictures and cuts in a desperate attempt to lure on the hesitating pupil. Other means are employed in this work to convince such a pupil that every hour spent with this book will more than repay his effort. The lack of constantly recurring breaks in the text to indicate the divisions of the work has behind it an endeavor to permit the teacher himself to set the extent of his assignments and to prevent pupils from deciding how much they will study, for it is a well-known fact that the student will stop automatically at the break between the lessons if such a break is indicated. We fail to see, too, why the digressions on Roman customs and manners should not meet with the approval of any reviewer. In them is material which the pupil should get in his course, but which the ordinary teacher rarely presents.

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Critical Realism, A Study of the Nature and Conditions of Knowledge.

By ROY WOOD SELLARS, PH.D., Assistant Professor of Philosophy in the University of Michigan. Chicago: Rand McNally & Co., 1916.

Upon thoughtful men philosophy has a claim of a nature which no other discipline possesses. Every normal human being from the savage to the genius has a metaphysical system, incoherent and imperfectly formulated though it may be. He has, for example, certain notions about the external world, the relation between this world and his own conscious life, and much else. He is therefore in an utterly different relation to this subject from what he is to physics or geology. The demand which it makes upon his attention is thus the demand that his thoughts concerning these matters shall be guided by the best thought of the race.

Professor Sellars, in his *Critical Realism*, has proceeded throughout upon the foregoing supposition. He shows first what the fundamental features of popular metaphysics are, and he likewise shows their untenability. It is physics, physiology, and psychology that have supplied the demonstration of this fact by showing that what appears to be an immediate vision of the external world is nothing of the kind; that in reality the external world is known to us only in an indirect way, and that every picture we form of it is modified by purely subjective factors, the traces of past experience. On the ruins of popular metaphysics men of science have essayed to build up systems of their own; those of Descartes and Locke were but the forerunners of many others. In so far as these thinkers assume a world really possessed of the "primary qualities of matter" as physics conceives matter for its own purposes, they can also be shown to be building without foundations. As a result we seem to be left with a universe consisting of finite centers of consciousness, or, as in the

Berkeleyian scheme, of finite minds plus the infinite consciousness of God. That the very nature of knowledge compels us to accept a world which is thus a system of minds and nothing more is vigorously asserted by a large number of contemporary students of metaphysics, though their songs are sung in many keys often far from accordant. The futility of these positions is exhibited by Professor Sellars by means of an analysis of the knowing process, in what is one of the best parts of his book. In particular they are shown to break down when tested by our knowledge of other minds than our own—a subject upon which most contemporary epistemologists are strangely reticent. With these illusory barriers broken down the question whether there is anything in the universe besides centers of consciousness becomes simply a matter of evidence. Professor Sellars holds—correctly, as I believe—that this evidence can be produced.

It runs along a number of convergent lines, but all turns in the last resort upon the recognition that our experience in sense perception is determined by other than mental factors, by factors which are not discoverable in one's own mind or in the mind of others. The conclusion that emerges is the existence of an "external world," but one of which we have no immediate vision, one of whose qualities and relationships we can know only in a very indirect and incomplete manner through the effects it produces in consciousness. The position thus reached is Realism, but not the naïve Realism of popular thought and some contemporary philosophers, but a Realism that has gone through the fires of criticism directed at these naïve conceptions by Berkeley, Hume, and Kant, and their followers.

The ways in which contemporary Idealists try to conceal from their eyes this determination of mental happenings by conditions which cannot be found in finite minds at least, Professor Sellars describes at some length. But he has not done it with sufficient completeness. He has not shown, as he might have shown, that the speech of the Idealist always betrayeth him; that, with all his criticism of, or contempt for, the category of causation as an instrument of metaphysical investigation, he will invariably be found to be accepting beliefs which have no justification whatever except the principle of causation; that the only question with any metaphysician is not whether he will use the principle, but whether he will do so openly and consistently and to the end, or whether he will rather sneak it in when his reader isn't looking and use it only when he finds it convenient. Professor Sellars also fails to deal with sufficient thoroughness with the difficulties which undoubtedly attend the use of the principle—difficulties which, if they do not justify, to a considerable extent explain this playing fast and loose with this fundamental conception. At these points the work might have been stronger. Nevertheless it is an admirable presentation, as a whole, of the data upon which a critical theory of Realism must rest. In particular, it is a welcome addition to the literature of the knowing process. It may thus be commended warmly to those who have passed beyond the stage of naïve Realism and still, whether through the influence of science or otherwise, find themselves compelled to look with suspicion upon the

pretensions of the various forms of Idealism. It may be commended with equal warmth to those who are interested in certain phases of the problem of knowledge which are more or less completely ignored in most treatises on psychology and are dealt with in an unsatisfactory manner in most contemporary works on logic and epistemology.

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Measurements of Some Achievements in Arithmetic. By CLIFFORD WOODY. New York: Teachers' College, Columbia University, 1916. Pp. 63.

This monograph presents a series of scales which are adapted to the measurement of the fundamental operations in arithmetic. In the derivation of these scales Mr. Woody has in a general way followed the methods which Buckingham and Trabue used respectively with spelling and completion tests. Readers who are familiar with the statistical nomenclature of scale formation will discover much of interest throughout the monograph. Other readers will derive their chief profit from a consideration of Part I, pp. 1-24, in which the author describes the arithmetic scales, gives directions for their uses, and discusses their values and limitations. Part II, pp. 25-63, presents a somewhat detailed account of the derivation of the scale.

The author has arranged two sets of scales: series A to be given when there is an abundance of time for testing, and series B to be used when the time is more limited. Each series consists of a separate scale for addition, subtraction, multiplication, and division. Each scale in series A is comprised of thirty-five or more problems arranged in an order which proceeds from very simple problems to those of successively increasing difficulty. Each pupil solves as many problems as he can in twenty minutes. The author has established comparative values for each problem and has elaborated several tables for use in estimating class averages. He has also presented tentative standards of achievement in each fundamental process for all of the grades from II to VIII.

The Woody scales will undoubtedly prove to be a valuable addition to the rapidly increasing number of instruments which are adapted to the measurement of achievement in school subjects. Just what proportion of total or essential arithmetical ability is measured by the Woody scales remains to be seen. Mr. Woody acknowledges a number of important assumptions which underlie the derivation of the scales, and he has been arbitrary repeatedly (possibly necessarily) in the selection of methods for computing problem values.

It will be interesting to compare the abilities of specific classes which have been tested by the Woody scales with their abilities as determined by the Courtis tests. If each series of tests measures general ability in the fundamental arithmetical processes, the averages maintained by any class, if large